

IN THE CLAIMS:

Please find below a listing of all pending claims. The statuses of the claims are set forth in parentheses. For those currently amended claims, underlined emphasis indicates insertions and ~~strike through~~ emphasis (and/or double brackets) indicates deletions.

1. (previously presented) A polarization mode dispersion compensator comprising:
 - a polarization transformer to transform polarization of an input optical signal;
 - a compensating optical unit to compensate for a polarization mode dispersion of the input optical signal and output an output optical signal;
 - a polarimeter to measure a state of polarization and a degree of polarization of the output optical signal and generate a feedback signal indicating the measured state of polarization and degree of polarization; and
 - a control circuit to generate, based on the feedback signal, control signals for adjusting the polarization transformer so that a plurality of target states of polarization in which the degree of polarization is measured are realized in output optical signals of following operations and to search the plurality of target states of polarization for a state of polarization corresponding to a maximum degree of polarization.
2. (previously presented) The polarization mode dispersion compensator according to claim 1, wherein
 - the polarization transformer includes multiple three-electrode structures on a LiNbO_3 substrate, whereby control voltages are applied such that a device operation of the polarization transformer corresponds to endless rotatable waveplates.
3. (previously presented) The polarization mode dispersion compensator according to claim 1, wherein

the compensating optical unit includes at least one of a polarization maintaining fiber and a birefringent crystal to introduce an amount of different group delay.

4. (previously presented) The polarization mode dispersion compensator according to claim 1, wherein

the compensating optical unit includes a plurality of sections of differential group delay introducing elements separated by at least one individually controllable variable retarder with an eigenaxis oriented at an angle of 45 degree with respect to an eigenaxis of each of two adjacent differential group delay introducing elements.

5. (canceled).

6. (previously presented) The polarization mode dispersion compensator according to claim 1, wherein

the control circuit records the measured state of polarization and degree of polarization, and calculates from polarization changes control signals for adjusting the polarization transformer in such a way that the target states of polarization are equally separated from each other and equally distant from an actual state in a polarization space.

7. (currently amended) The polarization mode dispersion compensator according to claim 6, wherein

the target states of polarization are preset and located on a circle around an actual state at a predefined distance in a polarization space.

8. (previously presented) The polarization mode dispersion compensator according to claim 1, wherein

the control circuit records the measured state of polarization and degree of polarization, calculates from polarization changes control signals for adjusting the polarization transformer in such a way that the target states of polarization are unequally separated from each other and unequally distant from the actual state in the polarization space, and weights measured degrees of polarization in the target states of polarization by using a distance between each target state of polarization and an actual state in a polarization space.

9. (original) The polarization mode dispersion compensator according to claim 1, wherein

the control circuit recognizes changing device characteristics of the polarization transformer in a case where a part of the target states of polarization are not realized, and takes countermeasures such that the polarization transformer operates like endless rotatable waveplates by recalculating a voltage which describes the device characteristics of the polarization transformer and generating a control signal for applying the calculated voltage to the polarization transformer.

10. (previously presented) A polarization mode dispersion compensator comprising:

- a polarization transformer to transform polarization of an input optical signal;
- a compensating optical unit to compensate for a polarization mode dispersion of the input optical signal and output an output optical signal;
- a distortion analyzer to measure a state of polarization and a distortion of the output optical signal and generate a feedback signal indicating the measured state of polarization and distortion; and

- a control circuit to generate, based on the feedback signal, control signals for adjusting the polarization transformer so that a plurality of target states of polarization in which the distortion is measured are realized in output optical signals

of following operations and to search the plurality of target states of polarization for a state of polarization corresponding to a maximum degree of polarization.

11. (previously presented) A method of polarization mode dispersion compensation, comprising:

- transforming polarization of an input optical signal through a polarization transformer;

- compensating for a polarization mode dispersion of the input optical signal through a compensating optical unit to generate an output optical signal;

- measuring a state of polarization and a distortion of the output optical signal to generate a feedback signal indicating the measured state of polarization and distortion; and

- adjusting the polarization transformer according to the feedback signal so that a plurality of target states of polarization in which the distortion is measured are realized in output optical signals of following operations and to search the plurality of target states of polarization for a state of polarization corresponding to a maximum degree of polarization.

12. (previously presented) The polarization mode dispersion compensator according to claim 1, wherein

- the maximum degree of polarization is a maximum degree of polarization in a circumference of an actual state in a polarization space.

13. (previously presented) The polarization mode dispersion compensator according to claim 1, wherein

- the control signals are adjusted to drive the polarization transformer according to the state of polarization corresponding to a maximum degree of polarization.

14. (previously presented) The polarization mode dispersion compensator according to claim 10, wherein

the maximum degree of polarization is a maximum degree of polarization in a circumference of an actual state in a polarization space.

15. (previously presented) The polarization mode dispersion compensator according to claim 10, wherein

the control signals are adjusted to drive the polarization transformer according to the state of polarization corresponding to a maximum degree of polarization.

16. (previously presented) The method of polarization mode dispersion compensation according to claim 11, wherein the maximum degree of polarization is a maximum degree of polarization in a circumference of an actual state in a polarization space.

17. (previously presented) The method polarization mode dispersion compensation according to claim 11, wherein the control signals are adjusted to drive the polarization transformer according to the state of polarization corresponding to a maximum degree of polarization.